In order to meet the challenges posed by a pathways based approach to risk assessment, an in-depth understanding of certain biological processes is required at a molecular level. The molecular initiating event (MIE), which we define as the initial interaction between a molecule and a biomolecule or biosystem that can be linked to an outcome via a pathway (Allen TE et al, 2014), is a key anchor to advancing our understanding of which pathways are perturbed by exposure to a chemical. By considering the MIE as two molecules interacting at an atomic level to cause an effect, we can use fundamental chemistry to predict whether an interaction is likely through in silico methods and in chemico assays. Alternatively, we can identify the MIE by investigating the biological response of a chemical in panels of in-vitro assays work down the levels of biological organization to predict the original MIE. Both of these approaches form the basis of our research activities in this area.

**Defining molecular initiating events in the adverse outcome pathway framework for risk assessment:**
Allen, T.E., Goodman, J.M., Gutsell, S., Russell, P.J.; Chemical Research in Toxicology; 27 (2014); 2100-2112